Personality and motivation are two topics that have each received a considerable amount of interest in the field of sport psychology. However, the nature of the relationship between the Big Five model of personality and self-determined motivation in athletics remains unclear. To address this issue, a sample of college athletes completed assessments of the Big Five model and self-determined motivation to participate in their sports. Results revealed that agreeableness, extraversion, and neuroticism were the strongest predictors of different levels of self-determined motivation. Practical implications and future directions in related research are also discussed.
THE BIG FIVE PERSONALITY MODEL AND MOTIVATION IN SPORT

A Thesis

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The Big Five Personality Model and Motivation in Sport

Personality is a topic that has been studied for several decades, both in the field of psychology generally, and more specifically in the field of sport psychology (Van den Auweele, Nys, Rzewnicki, & Van Mele, 2001). Within sport psychology, the interest in personality has diminished in recent years, and it is not as popular of a topic as it was in the mid-20th century. However, personality research is still a useful area of interest in helping to understand athletes.

Personality in sports is often characterized by the following question: are there characteristics of individuals that explain and predict how athletes think, feel, and behave? (Van den Auweele et al., 2001). If the answer to this question is yes, then more knowledge about athletes’ personalities can facilitate the understanding and prediction of athletic success. Much of the research on personality in sport has focused on identifying personality traits of individuals that differentiate elite athletes (those who compete at the national or international level) from non-elite athletes, or athletes from non-athletes (e.g., Sheard & Golby, 2010). However, the research does not support personality traits as being strong predictors of athletic ability or performance. In essence, there is no identifiable ‘elite athlete personality’ or even an ‘athlete personality’ (Van den Auweele et al., 2001), as athletes, or elite athletes, appear to have a wide range of differing personality characteristics. Therefore, the current study does not attempt to identify personality characteristics that directly predict athletic success.

While there is currently no accurate way to directly predict athletic success based on an individual’s personality, an athlete’s personality can be used to predict other aspects of the self that relate to performance. In more recent years, researchers have spent less time studying the direct relationship between personality traits and athletic performance (Duda, 1998), although researchers continue to examine the role of personality in sports. This is done by examining personality dispositions in relation to other constructs that may influence athletes in their sport participation. For example, athletes’ personalities may influence their level and type of motivation to participate in their sports, which then may influence their effort and athletic performance.

Knowledge about an athlete’s personality has a great deal of potential for both applied and theoretical work. From an applied perspective, if coaches know that in a certain situation, athletes’ personalities dispose them to react in a certain way, this will help the coach to more effectively deal with those athletes. As practitioners gain more knowledge and understanding about their athletes, it can only aid in their work with athletes.

In addition to other developments, sport personality research has developed from a strict trait orientation to an interactional orientation. In a trait orientation, personality traits are believed to affect individuals regardless of the situation. Personality traits are relatively constant across time and across a range of situations (Pervin & John, 1997; Van den Auweele et al., 2001; Weinberg & Gould, 2011), and the cause of an individual’s behavior comes mainly from within the person, rather than from any external sources (Aiken, 1993). Personality traits predispose people to act in a certain way, which is not a guarantee that they will act in congruence with their traits in every situation, but their traits make them more likely to behave in a particular way. For example, an individual
with an outgoing personality is likely to act accordingly in most situations, but there will still be situations in which that individual will act introverted.

However, the trait approach was criticized as an inadequate approach for the study of personality. Specifically, personality traits did not consistently predict behaviors across different situations (Mischel, 1968). This led to the emergence of the situation approach, which states that personality traits are not relatively consistent across time and situations (Weingberg & Gould, 2011; Van den Auweele et al., 2001). In contrast to the trait approach, the situation approach posits that the situation or environment has a significantly greater influence on a people’s behavior than their personality traits (Aiken, 1993; Pervin & John, 1997). For example, when people experience the loss of a loved one, they usually express a saddened mood, even if they are normally optimistic, enthusiastic people. In this case, their optimistic personalities have less of an impact than the situation.

The interactional approach combines aspects of both the trait and situational approaches. In an interactional orientation, personality dispositions are believed to interact with situational variables to affect individuals’ thoughts, feelings, and behaviors (Aiken, 1993; Pervin & John, 1997; Van den Auweele et al., 2001). This accounts for variability in human responses to different situations. The interactional approach applies directly to sport personality research as well as personality research in general. For example, an athlete’s disposition for aggression makes him/her more likely to play a sport aggressively, but he/she will not behave aggressively in all situations. When the situation is conducive to the athlete expressing aggression, then that personality trait is more likely to be expressed. However, if the situation is not conducive to aggressive behavior, then the athlete may not act aggressively.

Within the framework of an interactional approach, there are a number of personality traits that can interact with a wide range of situations. Situational variables could include both nominal situations, such as a sports game or competition, and active psychological features such as the behavior of another player or coach influencing the individual (Shoda, Mischel, & Wright, 1994). Thus, a high-pressure football game with an animated coach would elicit a different response compared to a casual practice round of golf with calm teammates. Sports personality research examines how personality variables may interact with these other situational variables to influence behavior.

The Big Five Personality Model

Personality in sports can be examined using one of a number of different models of personality. One model is the Big Five personality model, which has been applied to a wide variety of topics in the field of psychology. This model was chosen for the current study because the five traits of this model have been described as basic human personality traits (Costa & McCrae, 1992a). A basic dimension of personality is one that is stable across time, relatively stable across situations, cross-culturally stable, and has some degree of biological basis. It also should help to explain and predict important thoughts, feelings, and behaviors of individuals (Costa & McCrae, 1992a). A model of personality must meet these conditions in order to be of use, and the Big Five model meets all of these criteria. This does not suggest that the five personality traits that compose this model are the only basic or important traits, because personality is a broad concept that cannot be completely and exhaustively addressed by only the five-factor
model. However, the Big Five traits do summarize many significant traits that are addressed in the area of personality (Costa & McCrae, 1992a; Costa & McCrae, 2011). Each of the five factors has been shown to be useful for understanding personality (Piedmont, 1998), and the five-factor model is intended to be comprehensive, in that it encompasses several broad factors that are consistently found to be significant in personality research (McCrae & Costa, 1992).

The five traits that combine to form the Big Five are agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience (or openness). Agreeableness indicates that an individual is amiable, cooperative, tolerant, generous, and warm (Costa & McCrae, 1992b; Costa & McCrae, 2011; Goldberg, 1990). This trait relates to one’s interactions with others, and it describes the thoughts and feelings that an individual has about other people. An individual who is high in agreeableness shows compassion for others and tends to get along well with others. Someone who is low in agreeableness is typically uncaring, cynical, and has little regard for the welfare of others (Piedmont, 1998).

The next of the five characteristics is conscientiousness, which indicates that an individual is ordered, industrious, consistent, formal, and mature (Costa & McCrae, 1992b; Costa & McCrae, 2011; Goldberg, 1990). Individuals who are high in conscientiousness are more determined and motivated to reach their goals, and they are also reliable and have higher levels of self-control (McCrae & Costa, 2008; Piedmont, 1998). Those who are low in conscientiousness tend to be disorganized and irresponsible.

Extraversion indicates sociability, joyfulness, energy, and assertiveness (Costa & McCrae, 1992b; Costa & McCrae, 2011; Goldberg, 1990; Piedmont, 1998). The level of an individual’s extraversion relates to both the amount of time one wants to interact with others, and also the intensity of these interactions. Those high in extraversion appreciate spending more time interacting socially (McCrae & Costa, 2008), and extraverts tend to enjoy and are energized by their interpersonal interactions (Piedmont, 1998). In contrast, introverts are more comfortable in fewer and less intense social situations.

Neuroticism is psychological distress, anxiety, insecurity, a lack of emotional stability, and vulnerability to stress (Costa & McCrae, 1992b; Costa & McCrae, 2011; Goldberg, 1990; McCrae & Costa, 2008; Piedmont, 1998). Individuals with high neuroticism are more likely to be stressed and not cope well with these feelings (Costa & McCrae, 2011; Piedmont, 1998). Those who are low in neuroticism tend to have a brighter mood and experience less self-consciousness than their highly neurotic counterparts.

Lastly, openness to experience indicates creativity, curiosity, intellectualism, and knowledge (Costa & McCrae, 1992b; Goldberg, 1990). Those high on openness actively seek out new, unfamiliar experiences, and they take joy in these experiences, instead of choosing traditional options (Costa & McCrae, 2011; McCrae & Costa, 2008; Piedmont, 1998). Individuals who are low in openness are content with their habits and do not actively seek opportunities to try new things.

Each of these five factors has six facets scales, which serve to subdivide the five broader traits into the qualities that make up each trait. When describing only five traits that explain important aspects of an individual’s personality, each of those factors can be broken down into specific descriptors that illustrate the complexity of these human traits.
(Costa & McCrae, 1992b; McCrae & Costa, 1992). For example, an individual could score high on neuroticism because of a high score on the ‘anxiety’ facet, but still have a low score on the ‘self-consciousness’ facet. As with any personality characteristics, sharing similarities with these five traits does not eliminate the possibility of individual differences, even within a trait that is shared.

It should also be noted that the Big Five model can be viewed in congruence with an interactional framework. Although these characteristics have predictive and explanatory utility, the role of the environment must also be considered, since the five factors interact with situational variables to influence individuals (Costa & McCrae, 2011). The Big Five model provides insight into individuals’ personality characteristics, which predispose them to behave in particular ways. However, the environment also influences people, and it is the interaction of these personality predispositions and the environment that affects individuals’ thoughts, feelings, and behaviors (Aiken, 1993). For instance, someone who is highly extraverted will act outgoing in many situations because of his/her disposition toward this type of behavior, but he/she will not be outgoing in every situation.

The five-factor model is useful because it has applied implications in several fields of psychology. For example, a clinician may gain a better understanding of a client’s personality as a whole, which could aid in diagnosis and treatment of psychological problems. In sports, a coach who better understands the personalities of players may use this information to relate to players and adapt coaching strategies to their personalities. The fact that the Big Five model can be applied to a broad range of topics, such as school, work, exercise, and clinical populations (Ingledew, Markland, & Sheppard, 2004; Langelaan, Bakker, Van Doornen, & Schaufeli, 2006; Muller, Palekcic, Beck, & Wanninger, 2006; Piedmont, 1998), shows that it is a comprehensive and pervasive model of personality. The Big Five has been linked to several outcome variables, such as subjective well-being, happiness, affect, satisfaction, self-esteem, and quality of life. Specifically, positive correlations have been found with conscientiousness, extraversion, agreeableness, and openness, and negative correlations with neuroticism (Argyle & Lu, 1990; Chan & Joseph, 2000; Costa & McCrae, 1980; Steel, Schmidt, & Shultz, 2008). It may not cover all aspects of personality (and no single model should be expected to do so), but it addresses several important aspects of personality that can be used to help explain and predict a wide range of thoughts, feelings, and behaviors.

Motivation

One construct that the Big Five model has been consistently linked to is motivation, and it is an important concept in understanding human behavior, particularly as it relates to sports. Motivation is the “energization and direction of behavior” (Deci & Ryan, 1985, pp. 3), and someone who is motivated is actively attempting to engage in some sort of task or activity (Ryan & Deci, 2000a). Examining motivation is determining why people do whatever it is that they do (Deci & Ryan, 1985). As this definition suggests, motivation is a broad topic, as it relates to any and all behaviors in which humans engage. Although the focus of the current study is on motivation in the context of sports, the broader theories of motivation provide a useful framework for examining motivation in sports.
Drive theories of motivation were among the earliest theories of motivation, stating that there is some force that drives individuals to behave in a certain way, such as humans being driven by their hunger or thirst (Deci & Ryan, 1985). Using drive theory, psychoanalysts suggest that there is a strong sex drive that motivates people, as one of the basic human drives. Although drive theories proved useful in explaining certain basic human motivations, they ultimately are insufficient in explaining the complexities of human motivation (Deci & Ryan, 1985).

Behavioral theorists offer a different perspective on motivation. They argue that motivation is directed by stimulus-response patterns in which reinforcements of behaviors influence motivation (Deci & Ryan, 1985; Reeve, 2001). When individuals’ behaviors are reinforced, they are motivated to continue engaging in similar behaviors, with the expectations of similar reinforcements occurring. Likewise, if there is no reinforcement for a particular behavior, then a person is not motivated to continue engaging in such behavior. People are motivated to seek positive reinforcements and avoid any negative stimuli through their actions (Reeve, 2001). In this way, external environmental reinforcements direct human behavior (Skinner, 1953). For example, a child could be motivated to clean his room if his parents promised him an allowance for completing his chores. There is no internal drive for the child to clean his room, so drive theories do not account for the child’s motivation in this case. However, behavioral theories explain that the child’s behavior is being reinforced with a reward, and that serves as the motivation for cleaning his room. Behavioral theories of motivation extend beyond drive theories by addressing behaviors that are not motivated by basic needs (Deci & Ryan, 1985; Reeve, 2001).

However, many behaviors are not motivated by basic needs or because of reinforcement, but rather are done because of their inherent enjoyment. To address this issue, Deci and Ryan developed the Self-Determination Theory (SDT) as an alternative to previous theories (Deci & Ryan, 1985). SDT serves as the framework for examining motivation in the current study. SDT takes an organismic approach, meaning that individuals are assumed to act in such a way that they are effective in their environments and satisfy their own personal needs. These needs extend beyond biological needs, such as food, to include personal psychological needs as well. Internal structures influence individuals’ actions, and these structures are also being developed through interactions with the environment. Humans actively attempt to gain a degree of control over both their environments and over their own drives and emotions (Deci & Ryan, 1985). In doing so, they develop a unified internal structure that is part of their identities, and this internal structure then influences motivation.

SDT posits that every person has a natural tendency to develop and grow one’s sense of self (Deci & Ryan, 1985; Deci & Ryan, 2002). They are motivated to integrate their own identity and self with their environment and those around them with whom they interact. This means having an inner organization and control over one’s life, and also relating to others and integrating oneself with those people in one’s life (Deci & Ryan, 1985; Deci & Ryan, 2002). Normal, adaptive development involves an integrative sense of self that develops and adapts over time. This natural development is either supported or restricted by one’s social environment (Deci & Ryan, 1985; Deci & Ryan, 2002). Just as humans must have basic biological needs to survive, such as food and water, they have basic psychological needs to be met for healthy psychological development and
functioning. These are described as ‘human’ needs because they are universal and they can be found across time and across cultures (Deci & Ryan, 2002).

According to SDT, three basic human psychological needs are autonomy, competence, and relatedness (Deci & Ryan, 2002). Autonomy is the degree to which the perception of the locus of causality for one’s behavior is internal. An individual perceives greater autonomy for oneself when he/she has a more internal perceived locus of causality (Deci & Ryan, 1985; Deci & Ryan, 2002; Ryan & Deci, 2000a). When the locus of causality is internal, it means that the behavior is congruent with the individual’s sense of self and values. Greater autonomy equates to a greater perception of choice by the individual. People have a need to feel that the decisions that are being made in their lives are their own, and not completely out of their control.

The second basic psychological need is competence, which refers to the feeling of being capable of success in the social environment, and the ability to display one’s capabilities (Deci, 1975; Harter, 1983; White, 1959). This does not refer to being competent in a particular skill, but rather an overall confidence that is challenged and maintained by the individual. When an individual demonstrates success in an activity, this builds feelings of competence, whereas feelings of competence may be reduced when an individual is incapable of completing a task. Competence is developed over time, so people may experience failure at times and still maintain their competence. However, individuals must have some sense that they are capable of success to meet their need of competence.

The final basic psychological need is relatedness, which is a feeling of connection and affiliation with others (Baumeister & Leary, 1995; Bowlby, 1979; Harlow, 1958). Relatedness is feeling concern for others, and believing that others reciprocate those feelings. One can relate to others on an individual basis and develop close relationships. Alternatively, one can also feel like a part of a larger group of people and have a sense of community within the group.

In the case of all three of these needs, the environment can either support or thwart the satisfaction of these needs. Regardless of the level of support from the environment, people are motivated to satisfy these needs for themselves. Humans have the basic psychological needs to feel capable and self-determined, and they strive to meet these needs (Deci & Ryan, 1985). These needs are innate in people, although they are psychological, as opposed to the more physiological needs proposed in drive theories. Individuals seek out challenges in their environments that will allow them to meet their needs of competence and self-determination (Deci & Ryan, 1985; Deci & Ryan, 2002), which makes it a natural inclination to seek out new challenges and new perspectives (Deci & Ryan, 2002). People want to explore their curiosities and challenge themselves, expanding upon their capacities/capabilities and competencies. When they do so, their behavior is intrinsically motivated, which will be discussed in greater detail later.

For people to feel a sense of self-determination, they must believe that they are making their own choices without being controlled by any external influences. Self-determination involves humans experiencing an internal perceived locus of causality (Deci & Ryan, 1985). In essence, they believe that the cause of their actions comes from within themselves and not as a result of external forces. “Self-determination is the capacity to choose and to have those choices, rather than reinforcement contingencies, drives, or any other forces or pressures, be the determinants of one’s actions.” (Deci &
Ryan, 1985, pp. 38). This is what distinguishes SDT from other theories of motivation. Humans have a need to be self-determined, and this motivates them to engage in interesting activities, and they expect that these activities will help them to demonstrate their competencies. Self-determination means that one has choices, and decides what to do freely and without pressure or controlling manipulation from the outside environment. The environment can serve to either support self-determined behavior or restrict it.

**Intrinsic and Extrinsic Motivation**

The concept of self-determination facilitates a better understanding of motivation in general, and of extrinsic and intrinsic motivation specifically. Self-determined behaviors are inherently intrinsically motivated, while extrinsic motivation may be more or less self-determined, depending on the type of extrinsic motivation (Deci & Ryan, 1985). Intrinsic behaviors are those behaviors that are satisfying in and of themselves because of their inherent interest and enjoyment, regardless of reinforcements or lack of punishments (Deci & Ryan, 2002). Intrinsically motivated behaviors are done because they are fun or challenging (Ryan & Deci, 2000a). Also, individuals must have an interest in the activities they are doing in order for them to be intrinsically motivating (Deci & Ryan, 1985). Intrinsic motivation occurs when individuals are energized to act based on the pleasure that comes from the activity itself, rather than the external rewards of the activity.

In contrast to intrinsic motivation, extrinsic motivation comes from external pressures or anxiety, or if there is a material reward (Deci & Ryan, 1985). Extrinsic motivation refers to engaging in a behavior not because the behavior itself is enjoyable, but because it is expected that the behavior will result in a separate benefit (Ryan & Deci, 2000a). Extrinsically motivated behaviors are done because of external pressures or incentives. A final type of motivation is amotivation, which refers to having no motivation at all, or no energy to engage in a behavior. Amotivation is the least self-determined type of motivation.

Motivation can vary by the amount of motivation one has, and also by the orientation of that motivation (Ryan & Deci, 2000a). The orientation of motivation is the reason for a person’s motivation, whether someone is motivated to master a skill because of the expected rewards it will bring, or because it is enjoyable to master the skill. On the continuum of intrinsic motivation to extrinsic motivation to amotivation, there are varying levels of self-determination. Intrinsic motivation is the most self-determined, amotivation is not at all self-determined, and somewhere in between there are some forms of extrinsic motivation that have different degrees of self-determination (Ryan & Deci, 2000a). By differentiating between intrinsic motivation, extrinsic motivation, and amotivation, a variety of human behaviors can be understood more clearly through an SDT framework (Deci & Ryan, 2002). Those with greater intrinsic motivation are fulfilling their needs for self-determination, while those with amotivation have little sense of competence or autonomy (Vallerand, 1997).

Within the categories of intrinsic and extrinsic motivation, there are subcategories that explain each type of motivation in greater detail. There are three types of intrinsic motivation, the first of which is intrinsic motivation to know (IM to know). IM to know is the motivation to attain enjoyment, interest, and/or satisfaction from discovering and understanding something new in one’s life (Deci & Ryan, 2002; Vallerand, 1997;
Vallerand et al., 1992), such as learning a new sport skill. Intrinsic motivation to accomplish (IM to accomplish) is the motivation to gain enjoyment, interest, and/or satisfaction from accomplishing something, creating something, or doing something greater than what one has already done (Deci & Ryan, 2002; Vallerand, 1997; Vallerand et al., 1992). An example of this would be successfully completing an intricate art project. The final form of intrinsic motivation is intrinsic motivation to experience stimulation (IM to experience stimulation), which is the motivation to gain enjoyment, interest, and/or satisfaction from the stimulating sensations of the activity (Deci & Ryan, 2002; Vallerand, 1997; Vallerand et al., 1992). For example, the rush of stimulating sensation that comes from skydiving could generate IM to experience stimulation. These three subcategories of intrinsic motivation are all highly self-determined forms of motivation.

There is greater variability in the level of self-determination within the subcategories for extrinsic motivation. The different types of extrinsic motivation can be viewed on a continuum based on the level of self-determination of each one. From the most to the least self-determined, the four subcategories of extrinsic motivation are integrated, identified, introjected, and external. Integrated regulation is the type of extrinsic motivation that is most self-determined, and this type of motivation occurs when a behavior is in agreement with the individual’s sense of self as a whole (Deci & Ryan, 2002; Vallerand, 1997), and there is congruence between the behavior and the general aspects of the self. This explains why the motivation for integrated regulation is the most self-determined form of extrinsic motivation, being that the behavior is largely internalized. An example of integrated regulation would be a dedicated student who decides to study for an important test instead of going out with friends the night before the test. Studying may not be inherently enjoyable for the student, but it is in agreement with the student’s values to achieve a favorable test score, which leads the student to choose to study. Next on the continuum is identified regulation, which involves a slightly lesser sense of freedom of choice than integrated extrinsic motivation, but greater than introjected or external motivation (Deci & Ryan, 2002; Vallerand, 1997). For this type of motivation, the individual views the behavior as valuable, and the individual ‘identifies’ with the activity being done, although the activity is not completely integrated into the individual’s sense of self. The individual judges the behavior to be important to him/her and somewhat congruent with the sense of self. An example of identified regulation would be an athlete who engages in an off-season weight training program as a way to improve in his sport. In this case, weight training itself is not highly valued by the athlete (nor is it inherently enjoyable), but he does value playing well in his sport. Therefore, the behavior is somewhat self-determined, but his participation in weight training is only a way to gain improvement in the sport that he values highly.

The final two types of extrinsic motivation are associated with a low degree of self-determination. Introjected regulation involves a relatively smaller amount of internalization than integrated and identified regulation (Deci & Ryan, 2002; Vallerand, 1997; Vallerand et al., 1992). With introjected regulation, individuals are influenced by past contingencies, which may have been external in the past but are now starting to become internalized. Instead of feeling external pressure, pressure comes from within and individuals are motivated by feelings of obligation. Therefore the behavior is still not inherently enjoyable overall, but it is beginning to become internalized. For example,
someone who volunteers time for charity not for the benefit of those in need, but to appear altruistic and avoid guilt, would be doing so because of introjected regulation. External regulation, however, is not internalized at all. With external regulation, behaviors are done to gain an external reward or to avoid an external punishment, and the behavior itself is not the reward (Deci & Ryan, 2002; Deci & Ryan, 1985; Vallerand, 1997). This is the least self-determined form of extrinsic motivation. An example of this type of motivation is an athlete who competes in a tournament solely to win a trophy and does not take pleasure in the competition itself.

In contrast to both intrinsic and extrinsic motivations, amotivation is a complete lack of motivation. There is no external reward or punishment as a result of the behavior, nor is the behavior pleasurable in and of itself. Amotivated individuals believe they have little control and competence over their actions (Deci & Ryan, 2002; Deci & Ryan, 1985; Vallerand et al., 1992). As a result, individuals may stop participating in activities toward which they feel amotivation. In terms of self-determination, there is no self-determination involved in amotivated behaviors.

**Motivation and Sport**

Motivation is an essential construct of sport psychology, and athletes’ motivation is an important psychological component that contributes to the success (or lack of success) of athletes. There are a number of factors that influence an individual’s level and type of motivation, and also a number of outcome variables that are influenced by the individual’s motivation.

As mentioned earlier, personality is one factor that influences individuals’ motivation, although it is not the only factor that influences motivation. For example, others in the social environment can affect the level of intrinsic or extrinsic motivation a person experiences. Specifically, in the sport context, coaching behavior can influence players’ levels of self-determined motivation (Pelletier et al., 1995). Depending on their behavior, coaches can either support or thwart self-determination in their athletes. Also, receiving feedback about one’s athletic performance that is positive rather than negative has been related to higher levels of intrinsic motivation (Thill & Mouanda, 1990). Therefore feedback and coaching behaviors are two factors that may influence athletic motivation. These results can be explained through SDT because coaching behaviors and feedback can affect athletes’ perceptions of their own competence and autonomy. The more athletes believe in their own competence and autonomy, the more likely they are to be intrinsically motivated.

There are other external factors, such as scholarships for college athletes, which can influence the type of motivation displayed by athletes. If scholarships are perceived as controlling, because athletes are obligated to play in return for their scholarships, then they may have reduced intrinsic motivation. But if the scholarships are perceived as an indication of competence more so than controlling, then they may increase intrinsic motivation (Ryan, 1980). Another external factor could be an athlete competing to win some sort of a prize or trophy. This is nearly the definition of an external regulation. If the reason for an athlete’s participation in a competition is the resultant rewards, this would result in more extrinsic than intrinsic motivation from the athlete.

Past performances may also affect athletes’ motivation. Both team and individual performance can influence feelings of autonomy, competence, and relatedness, such that
these factors increase with increased performance. Increased autonomy, competence, and relatedness then lead to more self-determined forms of motivation (Vallerand & Rousseau, 2001). As shown from these examples, motivation is clearly a complex variable that is open to influence from a number of different variables.

Motivation is also related to a variety of outcome variables. Intrinsic and extrinsic motivation may influence individuals’ effort, performance, and satisfaction with their sport experiences, among other outcomes. According to SDT, the greater the degree of self-determination of individuals’ motivation, the more positive consequences will result. All three forms of intrinsic motivation, and even integrated and identified regulation, are considered to be more self-determined than introjected, external motivation or amotivation. Therefore, more positive consequences are expected to occur when athletes have greater intrinsic motivation.

More self-determined forms of motivation are associated with positive outcomes that directly relate to sport performance. For example, self-determined forms of motivation are associated with greater concentration, while less self-determined forms of motivation were associated with poorer concentration (Briere, Vallerand, Blais, & Pelletier, 1995, as cited in Vallerand & Rousseau, 2001; Pelletier et al., 1995). Furthermore, more self-determined motivation was positively associated with greater effort in sports (Pelletier et al., 1995), which should lead to improved performance, with all other things being equal (Vallerand & Rousseau, 2001). Self-determination toward sport predicts the use of task-oriented coping strategies during stressful sport competition, and non-self-determined motivation predicted the use of disengagement-oriented coping strategies (Amiot, Gaudreau, & Blanchard, 2004). All of these outcomes may contribute to improved athletic performance.

There are also positive outcomes that are not directly related to athletic performance. Among the positive outcomes that are related to intrinsic motivation is decreased negative affectivity among exercise participants (Vallerand & Blanchard, 1998, as cited in Vallerand & Rousseau, 2001). In athletes from a variety of sports, more self-determined forms of motivation (intrinsic and identified) were positively related to positive emotions, while less self-determined motivation (external and amotivation) were negatively related to positive emotions (Blanchard & Vallerand, 1996, as cited in Vallerand & Rousseau, 2001; McAuley & Tammen, 1989). Also, intrinsic motivation is a strong predictor of enjoyment in basketball (Brustad, 1988), and overall, self-determined motivation in sports is associated with many positive consequences, including positive affect, enjoyment, interest, desire to continue participating, satisfaction, health, and well-being (Frederick-Recascino, 2002; McCauley & Tammen, 1989; Sheldon & Kasser, 1995; Vallerand & Rousseau, 2001).

**Big 5 and Motivation**

As discussed above, there are many outcome variables linked to motivation, and there are also many antecedents of motivation. One such antecedent is personality. Although the relationship between personality (specifically the Big Five model) and self-determined motivation has been examined in achievement-related contexts such as education and exercise, it has not yet been investigated in the context of sports. However there is relevant research on the link between the Big Five personality traits and other psychosocial constructs in sport psychology. The following sections review the relevant
research that examines the relationship between personality and motivation in education and exercise, as well as the relationship between the Big Five model and other related sport psychology constructs.

**The Big 5 and Motivation in Educational Contexts**

There are a number of studies that have examined the relationship between the Big Five model of personality in the context of education. Many of these studies used students' academic performance rather than their motivational levels as the dependent variable. The overall results of many of these studies were recently examined as a group in a meta-analytic study conducted by Poropat (2008). A cumulative sample size of over 70,000 participants was drawn from a total of 80 published articles and unpublished dissertations. The data analysis revealed significant and positive correlations between the personality traits of conscientiousness, agreeableness, and openness with academic performance. The strongest effect size of the five personality factors on academic performance was found for conscientiousness, which was similar in magnitude to the influence of intelligence on students' academic performance.

De Feyter, Caers, Vigna, and Berings (2012) also investigated the relationship between the Big Five and academic performance. In their longitudinally-based study, these researchers examined the roles of motivation and self-efficacy as mediators/moderators of the overall link between personality and academic performance. A sample comprised of 375 Belgium university first year students completed a set of self-report inventories at three different times during a semester. At Stage 1 (early in the semester), students completed the Flemish version of the Neuroticism Extraversion Openness-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992c; Hoekstra, Ormel, & De Fruyt, 1996). At Stage 2 (mid-semester), they completed the Learning and Study Strategies Inventory (LASSI; Cano, 2006; Colaussen & Braten, 1998; Olejnik & Nist, 1992) to assess academic motivation and self-efficacy. Finally, at Stage 3 (end of semester), students' academic performance was assessed. Hierarchical regression analysis revealed that the Big Five model accounted for 47% of the variance in academic motivation, with conscientiousness being the strongest positive contributor. In addition, extraversion was positively predictive of academic motivation while openness was negatively predictive.

Clark and Schroth (2010) further explored the Big Five model in the academic context, and also added greater detail to the measurement of motivation. In this study, researchers investigated the relationship between the Big Five personality traits and academic motivation in a sample of 451 college freshmen. Participants completed the Academic Motivation Scale College Version (AMS-C 28; Vallerand et al., 1992; Vallerand et al., 2004) to measure their levels of self-determined motivation to engage in academic work, and also completed the 50 Big Five Factor Markers scale (Goldberg, 2004), which assesses the Big Five personality traits. In general, the results of this study provided support for the overall predictive relationship between the Big Five markers and students' intrinsic and extrinsic forms of academic motivation. More specifically, openness was positively correlated with intrinsic motivation, while increased extraversion and conscientiousness were correlated with increases in both intrinsic and extrinsic motivation. Neuroticism was the only one of the Big Five traits that was associated more strongly with extrinsic motivation, including introjected motivation. Additionally,
amotivation was negatively correlated with agreeableness and conscientiousness. As Clark and Schroth pointed out in their discussion, while the Big Five appear to predict academic motivation in general, the associations between the Big Five and the less self-determined forms of motivation (external regulation and amotivation) are relatively weaker while the correlations between the Big Five and the self-determined forms are stronger.

In addition to correlational analyses, Clark and Schroth (2010) also used regression procedures to determine the predictive links between the Big Five personality model and each type of motivation. All results were significant. Specifically, agreeableness, conscientiousness, extraversion, and openness were positively related to intrinsic motivation, and neuroticism was negatively related to intrinsic motivation. However, there were differences in the personality traits that predicted the different subtypes of intrinsic motivation. For example, for intrinsic motivation to experience stimulation, openness was the only individual personality trait that was a significant predictor. However, the same results were not found for the intrinsic sub-types of to know or accomplish. There were differences in the patterns of relationships between the Big Five and self-determined motivation, but overall this study demonstrates a relationship between personality and motivation in the academic context.

To further examine the relationship between the Big Five and academic motivation, Komarraju, Karau, and Schmeck (2009) collected self-report data from 308 undergraduate students. Participants completed the Academic Motivation Scale (AMS; Vallerand et al., 1992) and the NEO-FFI (Costa & McCrae, 1992c) to assess the Big Five traits. The data demonstrated significant relationships between the Big Five traits and academic motivation. Specifically, 17% of the variance in intrinsic motivation was accounted for by conscientiousness and openness, and 13% of the variance in extrinsic motivation was accounted for by neuroticism, conscientiousness, and extraversion. In both cases, higher levels of these traits were associated with higher levels of motivation. Additionally, 11% of the variance in amotivation was accounted for by agreeableness and conscientiousness, such that higher agreeableness and conscientiousness were associated with lower levels of amotivation. Although there are inconsistencies between the results from Komarraju and colleagues (2009) and Clark and Schroth (2010), these results continue to support the value of the Big Five personality model in predicting motivation.

Similar results were found in a study examining the relationships between personality, academic motivation, and the perceived learning environment (Muller et al., 2006). Data were collected from 730 university students from Croatia who completed measures of personality (Goldberg, 1999) and academic motivation (Vallerand et al., 1992). All of the Big Five traits were significantly related to measures of increased self-determination, with all but neuroticism being positively related. Additionally, hierarchical regression analyses showed that conscientiousness, neuroticism, and openness each predicted a significant portion of the variance in learning motivation. Individuals who were high in conscientiousness and openness, and low in neuroticism had higher self-determined motivation to learn.

Taken as a whole, the preceding studies demonstrate the there is a relationship between the Big Five personality model and academic performance, and the five personality constructs are also predictive of students' academic motivation. The relationship between specific personality traits and specific subtypes of motivation,
however, was not completely clear because of inconsistencies between studies. Despite this fact, patterns did emerge between certain personality traits and self-determined motivation. Specifically, the results suggest that conscientiousness is a strong positive predictor of both intrinsic and extrinsic motivation, and a negative predictor of amotivation. Neuroticism was positively associated with extrinsic motivation and negatively associated with intrinsic motivation. Additionally, openness was related to higher levels of intrinsic motivation.

The Big 5 and Motivation in Exercise Contexts

A number of studies have examined the association between the Big Five model of personality and motivation in the context of exercise and exercise behaviors. The following section reviews relevant research on this topic, based on a few recent studies that are focused on the Big Five and motivation to exercise.

Ingledew and colleagues (2004) investigated the link between the Big Five model and self-determined motivation among exercisers. Data were collected from a sample of 214 individuals who attended a recreational sports center in England. Participants completed measures of exercise motivation and personality, which were assessed using the Behavioral Regulation in Exercise Questionnaire (BREQ; Mullan, Markland, & Ingledew, 1997) and the NEO-FFI (Costa & McCrae, 1992c), respectively. Partial correlations allowed researchers to examine the role of each personality trait individually, while controlling for the other four personality traits. Results demonstrated that neuroticism, extraversion, and conscientiousness were all related to certain levels of self-determination to engage in exercise. Specifically, neuroticism was related to introjected regulation (low self-determination), while extraversion was related to more identified regulation and intrinsic motivation, and conscientiousness was related to lower external regulation and greater intrinsic motivation. Therefore, greater neuroticism was associated with less self-determined motivation, while extraversion and conscientiousness were associated with more self-determined motivation.

Ingledew and Markland (2008) also examined the association of personality and exercise motivation. In this study, 252 English office workers completed self-report surveys of the Big Five personality traits and motivation for exercising. The Big Five model was measured using items from the International Personality Item Pool (Goldberg, 1999). Exercise motivation was measured using the Exercise Motivations Inventory version 2 (EMI-2; Markland & Ingledew, 1997), which includes 14 subscales that describe different reasons for engaging in exercise, and the Behavioral Regulation in Exercise Questionnaire version 2 (BREQ-2; Markland & Tobin, 2004), which assesses different types of intrinsic, extrinsic, and amotivation. Researchers found direct correlations between Big Five traits and self-determined motivation. Specifically, agreeableness and conscientiousness were negatively related to external and introjected regulation, while neuroticism was positively related to external and introjected regulation. Also, openness was indirectly positively related to identified regulation.

Lewis and Sutton (2011) further examined issues of the Big Five model of personality and exercise motivation. Researchers collected data from 100 individuals who exercised at a fitness facility at a large university in the U.K. Participants completed a 50-item questionnaire from the International Personality Item Pool (Goldberg et al., 2006) and the BREQ-2 (Markland & Tobin, 2004). Correlations demonstrated that
conscientiousness was negatively related to external regulation, and neuroticism was positively related to introjected regulation. Additionally, extraversion was positively correlated with identified regulation and negatively correlated with amotivation. There were no other significant relationships between personality traits and exercise motivation.

In summary, the research examining the relationship between the Big Five model and exercise motivation extends the results from the research in the educational field by examining a context that is more closely related to sport. In the exercise domain, it has been demonstrated that the personality traits of the Big Five model are related to different levels of self-determined motivation. The studies reviewed in this section demonstrate a pattern of results that suggest that conscientiousness is positively related to high levels of self-determined motivation and negatively related to low levels of self-determined motivation. In addition, extraversion is positively related to identified regulation, and neuroticism is positively related to types of motivation that are low in self-determination.

The Big Five and Motivation in Sport Contexts

As noted earlier, past sport psychology research has investigated personality as a direct predictor of athletic success, yet there is not support for this relationship (e.g., Sheard & Golby, 2010). No personality traits or personality models have been found to reliably predict differences between athletes who are successful versus those who are not. In addition, no support has been found for the idea that personality traits or models can differentiate elite from less elite athletes (Van den Auweele et al., 2001). However, it is possible that personality may be indirectly related to athletic performance through another variable, such as motivation. A review of the current literature on the topic revealed no studies that have investigated a possible relationship between the Big Five model and motivation in sport. However, there are a number of related studies that examined the association between the Big Five with what may be relevant aspects of athletes' psychosocial status. These relevant studies are reviewed in the following paragraphs.

Allen, Greenlees, and Jones (2011) examined the Big Five personality model in relation to coping strategies among athletes. Researchers recruited 253 athletes from a variety of different skill levels and sports to complete assessments of personality and coping. The NEO-FFI (Costa & McCrae, 1992c) was used to assess the Big Five, and the Coping Function Questionnaire for Sport (CFQ; Kowalski & Crocker, 2001) was used to assess differences in coping strategies, including avoidance-focused, emotion-focused, and problem-focused coping. Researchers analyzed the data using a one-way MANOVA, and with the five personality traits included in one step of the analyses, extraversion was the only significant predictor, relating to greater problem-focused coping. Higher extraversion and openness interacted with low neuroticism to predict greater problem-focused coping. Also, extraversion, agreeableness, and openness all interacted to predict greater emotion-focused coping. Additionally, conscientiousness predicted emotion-focused coping, and high neuroticism and low openness were predictors of avoidance-focused coping.

Kaiseler, Polman, and Nicholls (2012) also investigated the relationship between the Big Five and coping strategies in the sport context. The Big Five traits, coping strategies, and perceptions of coping effectiveness were assessed in a group of 482 athletes. Results revealed that neuroticism was a predictor of low perceived stress
control, while conscientiousness predicted higher perceived stress control. Neuroticism was also positively related to greater emotion and avoidance coping strategies, and less problem-focused strategies. In contrast, the other four personality traits (agreeableness, conscientiousness, extraversion, and openness) were positively related to coping strategies that were more adaptive and perceived as more effective.

The Big Five model has also been used to predict psychosocial constructs other than coping in sport. Binboga, Guven, Catitkcas, Bayazit, and Tok (2012) recruited 30 Turkish taekwondo athletes for a study examining personality and pre-competition anxiety among athletes. Participants completed the Five Factor Personality Inventory (FFPI; Somer, Korkmaxz, & Tatar, 2002), the Spielberg State-Trait Anxiety Inventory (STAI; Spielberger, Goruch, & Lushene, 1970), and a measure of electrodermal activity (EDA) to assess physiological arousal prior to a competition. Results showed that agreeableness and conscientiousness were negatively related to physiological arousal. Neuroticism was positively related to EDA one day prior to the athletic competition. Also, stepwise regression analyses showed that the model containing only agreeableness explained a significant amount of the variance in EDA scores 1 hour before competition. Therefore, agreeableness was identified as an important predictor of pre-competition physiological arousal.

Laurin and Nicolas (2009) further investigated an aspect of the Big Five in the context of sport. Specifically, researchers examined the interaction of conscientiousness, self-determination, and satisfaction among a sample of 81 male athletes from a French soccer academy. Participants completed the conscientiousness subscale of the French translation of the Neuroticism Extraversion Openness-Personality Inventory (NEO-PI) and the Sport Motivation Scale (SMS; Briere et al., 1995), which measures athletes’ self-determined motivation to participate in sport. Results demonstrated that conscientiousness positively correlated with self-determination to play soccer, and that self-determination mediated the relationship between conscientiousness and satisfaction.

The studies discussed above support the value of the Big Five model in predicting important psychosocial constructs, such as coping and anxiety. Of the five traits, conscientiousness was a most consistently identified predictor. Conscientiousness was significantly negatively related to physiological arousal and positively to perceptions of stress control (Binboga et al., 2012). It was also related to using emotion-focused coping strategies (Allen et al., 2011). There were also some significant relationships between the other Big Five traits and these psychosocial constructs. Neuroticism was linked with greater perceived stress, physiological arousal, and avoidance-focused coping strategies (Allen et al., 2011; Binboga et al., 2012; Kaiseler et al., 2012). Extraversion was associated with problem-focused coping and openness was associated with avoidance-focused coping (Allen et al., 2001; Kaiseler et al., 2012). Additionally, agreeableness negatively correlated to physiological arousal and perceived stress (Binboga et al., 2012). In general, then, the relevant or related research studies indicate that the Big Five model is a significant predictor of a number of psychosocial constructs.

**Overview and Rationale for Study**

The current research in sport psychology does not directly address the possible relationship between the Big Five model of personality and motivation in sport. However, there is a substantial amount of related research in other achievement domains,
specifically in the education and exercise domains. The education and exercise literature demonstrate that there are significant associations between the Big Five and motivation in such achievement domains. Also, in the sport psychology literature, the Big Five model has been shown to be a significant predictor of psychosocial variables, such as anxiety and coping strategies, which are related to motivation. Therefore, this research provides some support for the notion that the Big Five model may predict motivation in the sport domain as well.

The purpose of the current study is to examine the relationship between the Big Five model of personality and self-determined motivation in sport. Although there is evidence to suggest that the Big Five model predicts motivation in sport, the exact nature of the relationship between these two variables is not completely clear. Specifically, there are inconsistencies between which of the Big Five traits predict different types of motivation across the different studies discussed above. For example, openness was linked to intrinsic motivation in educational contexts, but in the context of exercise it was related to identified regulation. These inconsistencies may be due to the contextual differences between the two achievement activities. It is also possible that the inconsistencies are due to the use of different instruments to measure motivation across studies, or differences in categorizing motivation (e.g., comparing intrinsic motivation to extrinsic motivation in some cases, or comparing the subscales of each type of motivation in other cases). Additionally, the variability of results in the literature could be due to the variability in the statistical analyses that have been used. Specifically, correlational and simple regression procedures have most typically been chosen. However there is at least a moderate amount of correlation between the Big Five traits and between the individual subscales from the motivation construct. Such correlation may obscure the unique contributions that each variable makes to the overall relationship between the two sets of data (Big Five and motivation). Therefore, statistical analyses that account for such correlation may provide a clearer explanation of the relationship between these traits and motivation. The current proposed study was designed to address these issues by using a full range measure of sport motivation (including all forms of self-determined and non-self-determined motivation along with amotivation) and by using statistical techniques or procedures that will allow for consideration of the correlations between the subscales within both the Big Five model and the motivation instrument.

Hypotheses:

The Big Five personality model has been shown to predict a number of different variables in the field of sport psychology, as well as predicting motivation in other achievement domains, such as education and exercise. The Big Five traits are associated with different levels of self-determined motivation, however this relationship has only been established in certain domains. The current study is directed at examining the relationship between the Big Five personality model and motivation to participate in sport. Based on the research that has been conducted in other achievement domains (e.g., education and exercise) and on related research in the sport psychology area, the following hypotheses are forwarded.

- The five-factor model is expected to explain a significant amount of the variability between athletes in their levels and types of sport motivation.
• Conscientiousness is expected to be the strongest predictor and to be positively predictive of greater self-determined forms of motivation (intrinsic motivation and self-determined forms of extrinsic motivation), and negatively predictive of amotivation.

• Neuroticism is expected to positively predict less self-determined forms of motivation (amotivation and extrinsic motivation) and negatively predict intrinsic motivation.

• The links between motivation and the three other personality factors (e.g., agreeableness, extraversion, and openness) are expected to be less strong but also positively related to self-determined forms of motivation and negatively related to amotivation.

Method

Participants
Following IRB approval, participants were recruited from varsity athletic teams at Miami University, from a variety of both team and individual sports. Participants were 183 Division I varsity athletes from a medium-size Midwestern university (52% female, n = 96). The racial composition of the sample reflected that of the university overall (91% white, n = 168). Participants’ ages ranged from 18-23 (M = 19.81, SD = 1.18). Participants represented athletes from a wide range of sports: baseball (n = 29), basketball (n = 5), cross country (n = 7), golf (n = 2), hockey (n = 8), soccer (n = 21), softball (n = 16), swimming (n = 45), synchronized skating (n = 30), track and field (n = 12), and volleyball (n = 8). Nineteen participants had full athletic scholarships, 113 had partial scholarships, and 49 had no scholarships. Participants had been competing in their respective sports for an average of 10.05 years (SD = 4.36).

Means and standard deviations for the five personality variables and nine motivation variables are shown in Table 1. Cronbach’s alpha or internal consistencies were adequate for both the personality variables, ranging from .70 for openness to .85 for conscientiousness, and for the motivation variables, ranging from .69 for identified regulation to .94 for intrinsic motivation.

Procedure
To recruit college athletes for this study, coaches of Miami athletic teams were contacted via email and phone to ask if they would allow their players to participate as a group. If coaches agreed to cooperate, the researcher and each coach arranged a time and place for the researcher to address the team as a group, such as immediately before or after a team practice or meeting, at the team’s typical practice/meeting location. The coach was asked to notify the team members in advance that the researcher would be coming to address the team regarding a study. The researcher offered to provide team coaches with a general analysis of the team’s personality traits and motivations, in return for their assistance (although the coaches did not have access to any individual player data). At the time of the meeting, the coach introduced the researcher to the team, stated that the researcher is conducting a study and is asking for them to participate, although participation is completely voluntary. At this time, the coaches left the team members with the researcher. The researcher then explained to the team members that the current
study attempts to learn about athletes’ personalities and motivations, and it would be appreciated if they were willing to volunteer to participate.

The requirements of their participation were to complete two surveys, which will take approximately 20 minutes. The process of informed consent was explained to the participants. The surveys are not of an intimate, personal nature, and therefore there was little risk in participating, and also participants were not paid for their participation. However, participants were offered feedback about their personalities and motivations, based on the results of the surveys. Participants were given the option to leave their email addresses with the researcher, who would send them an analysis of their results if they are interested. Next, the inventories were distributed to any of the athletes who were willing to participate, and the researcher was available to the participants to answer any questions. Participants were free to withdraw at any time. The order of the two inventories was evenly counterbalanced, with half of the participants completing the personality inventory first, and half of the participants completing the motivation inventory first. Following the completion of the inventories, participants were thanked and given the researcher’s contact information in the event that they had any additional questions in the future.

**Measures**

**Personality:** The Neuroticism Extraversion Openness-Five Factor Inventory-3 (NEO-FFI-3; McCrae & Costa, 2007; see Appendix A) was used to assess personality. The NEO-FFI-3 measures the five personality traits of the Big Five model: agreeableness, conscientiousness, extraversion, neuroticism, and openness. There are a total of 60 items, and participants are asked to rate their personalities on five-point scales for each individual item, from *strongly disagree* to *strongly agree*. The NEO-FFI-3 was developed from the original NEO-PI, which is a 240-item inventory that measures the five personality traits of the Big Five model, as well as six facet scales for each of the five major traits (Costa & McCrae, 1992c). Following the development of the NEO-PI, the NEO-FFI was created as a shortened version of the NEO-PI, measuring only the five major factors. Thus the NEO-FFI has only 60 items and does not contain the facets scales for any of the five factors. However, the original NEO-FFI required revision after the stability of the Extraversion and Openness factors was questioned (e.g., Egan, Deary, & Austin, 2000), leading to the development of the Neuroticism Extraversion Openness-Five Factor Inventory-R (NEO-FFI-R; McCrae & Costa, 2004). Finally, the current NEO-FFI-3 is a revised version of the NEO-FFI-R and is largely identical to the NEO-FFI-R, with the exception of one item being replaced to improve psychometrics and comprehension (McCrae & Costa, 2007).

The NEO-FFI-3 has been shown to be an adequate measure of the Big Five personality characteristics for both adolescents and adults (McCrae & Costa, 2007). The psychometric properties of the NEO-FFI-3 were assessed using both an adolescent sample and an adult sample of participants. The adolescent sample consisted of 536 individuals between the ages of 14 and 20, approximately half of whom were female, who described themselves as White (84.6%), Asian/Pacific Islander (7.6%) or another race (7.8%; McCrae, Costa, & Martin, 2005). One hundred eighty of these participants also had a sibling complete a rating of their personalities, which was used to obtain cross-observer validity. All of the cross-observer coefficients were adequate, with values of .72
or higher for all five of the scales. In the adult sample, participants were 635 adults between the ages of 21 and 91, 56% women, and they described themselves as White (92.6%), Asian/Pacific Islander (1.6%), or another race (5.8%; McCrae, Martin, & Costa, 2005). From this sample, approximately three quarters of participants had received education beyond the high school level. Five hundred thirty two of these participants also had spouses, friends, or others complete a rating of their personalities, which was used to obtain cross-observer validity. Again, all of the cross-observer coefficients were adequate, with values of .77 or higher for all of the scales. Additionally, both the adolescent and adult samples displayed adequate internal consistency, ranging between .72 and .88 for all of the scales (McCrae & Costa, 2007). Also, test-retest reliability was established using a sample of 208 college students over a three-month period (Weiner & Greene, 2008). The values for the test-retest reliability of the five factors used in the NEO-FFI-3 were adequate, ranging from .75 to .83 across all five scales, with an average of .79. These data support the satisfactory psychometric properties of the NEO-FFI-3, and it is even improved over previous versions of the same scale. Therefore, the NEO-FFI-3 is an appropriate measure of the Big Five personality traits.

**Motivation:** Motivation to participate in sports was measured using the Behavioral Regulation in Sport Questionnaire (BRSQ; Lonsdale, Hodge, & Rose, 2008b; see Appendix B). The BRSQ measures individuals’ motivation or reasons for wanting to participate in their sport. There are nine subscales: Intrinsic Motivation-General, Intrinsic Motivation to Know, Intrinsic Motivation to Accomplish, Intrinsic Motivation to Experience Stimulation, Integrated Regulation, Identified Regulation, Introjected Regulation, External Regulation, and Amotivation. Participants are asked to rate their reasons for participating in sport on seven-point scales, with four items for each subscale, for a total of 36 items. The BRSQ was developed because motivation is an essential part of sports, and this scale was intended to assist researchers in determining what drives athletes to participate in their sports.

Reliability data for the BRSQ were collected from a sample of 316 New Zealand university athletes from a variety of sports, male and female, mean age 19.4 years. Results revealed adequate internal consistency for all subscales (α > .75 for all subscales; Lonsdale et al., 2008b). Construct validity was established by comparing the BRSQ subscales to individuals’ ratings of flow and burnout. In accordance with Self-Determination Theory (Deci & Ryan, 1985), controlled subtypes of motivation were expected to be negatively related to flow, and positively related to burnout. In contrast, autonomous forms of motivation were expected to be positively related to flow, and negatively related to burnout. These expected results were confirmed in support of the construct validity of the BRSQ. To assess the test-retest reliability of the BRSQ, Lonsdale and colleagues (2008b) conducted an additional study. A sample of 34 adult, competitive athletes, mean age 22.4 years, completed the BRSQ twice, seven days apart, and results showed adequate test-retest intraclass coefficients for all subscales (average coefficients = .84).

**Demographic Measures:** Participants completed a survey describing their demographic information and previous sport experience (see Appendix C). Demographic information included age, race, and gender. Previous sport experience included the number of years the participants had been playing competitively, what levels of competition, and what sport.
Statistical Analyses

To examine the relationship between athletes’ personalities and motivations, multiple statistical techniques were employed. First, descriptive statistics (listed above) and correlations between personality and motivational variables were examined. These initial analyses examined whether the variables were normally distributed and if the variables were related to each other bivariately. If the variables had been non-normal, data transformations would have been pursued. Significant bivariate relationships are necessary for regression and modeling based analyses. Next, multiple linear regressions were conducted, with all five personality traits regressed on each of the nine motivational variables separately (for a total of nine regressions). The nine multiple linear regressions examined the predictive ability of the personality constructs for each type of motivation independently. For example, the five personality constructs (openness, conscientious, extraversion, agreeableness, and neuroticism) predicted Internal Motivation. Finally, given the complexity of the relationship between personality and sport motivation, structural equation modeling was used to further examine the relationship. Structural equation modeling allowed for the examination of all of the dependent variables or the types of motivation simultaneously and for the examination of mediation or indirect effects. Structural equation modeling yielded a model with good fit, which better explains the complexity of the association between personality and motivation among athletes.

Results

Correlational Analyses

Correlational analyses of the personality and motivation variables revealed a number of significant relationships (see Table 2). There were significant correlations between conscientiousness and all other personality and motivation variables, with the exception of openness. Agreeableness significantly correlated with all other variables, excluding neuroticism and identified regulation. Among the motivation variables, intrinsic motivation correlated with all variables, excluding openness, and amotivation had significant relationships with all variables, with the exception of openness. While the majority of both the personality and motivation variables correlated with several variables, openness had the fewest correlations, sharing significant correlations with only three other variables, agreeableness, intrinsic motivation to know, and identified regulation. It should be noted that although many of the correlations were significant, many of the variables were not correlated strongly. For example, extraversion correlated with conscientiousness, identified regulation, and introjected regulation, yet the correlations values were not very high (less than .20). Other correlations were stronger, such as the correlations between amotivation and external regulation, introjected regulation, and intrinsic motivation (.60 or higher). Despite these strong correlations, the other, weaker correlations should be interpreted with caution. Although the results may be statistically significant, they may not represent meaningful relationships between variables. This is particularly important when the correlations are weaker and thus the percent variance accounted for is also very low.

Regression Analyses
Given the high rate of correlations between the personality and motivation variables, regression analyses were conducted to clarify the relationships between variables. Regression analyses were conducted with each of the nine motivation variables separately analyzed as criterion variables, with each motivation variable regressed on the personality variables. Significant regressions are shown in Tables 3-10. The regression analysis for Intrinsic Motivation to Know was the only regression that proved to be non-significant.

The Big Five significantly predicted intrinsic motivation, $F(5, 177) = 4.78, p < .001$, adjusted $R^2 = .094$, with neuroticism ($\beta = -.20, p = .01$) negatively predicting intrinsic motivation as the only significant predictor. The Big Five significantly predicted intrinsic motivation to achieve, $F(5, 177) = 3.95, p = .002$, adjusted $R^2 = .075$, with extraversion ($\beta = .19, p = .01$) and conscientiousness ($\beta = .21, p = .01$) as positive predictors of intrinsic motivation to achieve. The Big Five significantly predicted intrinsic motivation to experience stimulation, $F(5, 177) = 4.70, p < .001$, adjusted $R^2 = .092$, and none of the individual personality variables were significant predictors. The Big Five significantly predicted integrated regulation, $F(5, 177) = 3.02, p = .012$, adjusted $R^2 = .053$, with extraversion ($\beta = .22, p = .01$) as the only significant (positive) predictor. The Big Five significantly predicted identified regulation, $F(5, 177) = 4.77, p < .001$, adjusted $R^2 = .094$, with openness ($\beta = .27, p < .01$) as the only significant (positive) predictor. The Big Five significantly predicted introjected regulation, $F(5, 177) = 10.88, p < .001$, adjusted $R^2 = .213$, with neuroticism ($\beta = .36, p < .01$) and agreeableness ($\beta = -.32, p < .01$) predicting introjected regulation. The Big Five significantly predicted external regulation, $F(5, 177) = 7.68, p < .001$, adjusted $R^2 = .155$, with neuroticism ($\beta = .27, p < .01$) and agreeableness ($\beta = -.27, p < .01$) as the significant predictors again. Finally, the Big Five significantly predicted amotivation, $F(5, 177) = 5.94, p < .001$, adjusted $R^2 = .120$, with neuroticism ($\beta = .30, p < .01$) as the only significant, positive predictor.

Across the eight significant regression analyses, notable patterns were revealed. Of the Big Five traits, neuroticism appeared as a significant predictor most often, negatively predicting intrinsic motivation, and positively predicting introjected and external regulation and amotivation, which are lower in self-determination. This may suggest that neuroticism has a different relationship with the motivation variables, as compared to the other four personality variables (these differences will be discussed in greater detail below). Extraversion was also significant in multiple regressions, positively predicting intrinsic motivation to achieve and integrated regulation, which are higher on the continuum of self-determined motivation. Additionally, agreeableness was a significant negative predictor of introjected and external regulation, indicating that low agreeableness may predict lower levels of self-determined motivation.

**Structural Equation Modeling**

The results from the regression analyses provided useful information in explaining the Big Five model in relation to self-determined motivation. However, those analyses fell short of demonstrating a clear, consistent picture of the relationship between the personality variables and motivation. For example, agreeableness was a significant predictor of two different types of motivation, yet it did not emerge as a significant predictor in the other regressions. Furthermore, similar results were found for other
personality variables. Given the complexity of the relationship between personality and motivation (see Allen et al., 2011; Ingledew et al., 2004), additional statistical analyses were explored to further examine the relationship in the form of structural equation modeling (SEM). Structural equation modeling allows more complex relationships to be explored. Previous research indicates that motivation variables can be grouped into underlying structures or latent variables, such as Autonomous Extrinsic Motivation and Controlled Extrinsic Motivation (Lonsdale et al., 2008b). These groupings are possible with SEM, but not with regression analyses. SEM also allows for multiple dependent variables to be included in one analysis, while regression analyses may only include one dependent variable in each analysis. Because the different subtypes of motivation are related, examining all of them in one model may prove useful. Additionally, SEM allows for both predictive and measurement error, while regression analyses do not.

Therefore, structural equation modeling techniques were employed to further clarify the relationship between personality and motivation, using MPlus structural equation modeling software (Muthén & Muthén, 1998-2007). The following criteria were used to determine the best-fitting model: the fit of the model with hypotheses of the relationships between variables, based on previous studies and the regression analyses in the current study; global fit indices (comparative fit index [CFI] > .95; Tucker–Lewis index [TLI] > .95, Hu & Bentler, 1999; chi-square); and micro fit indices (root mean square error of approximation [RMSEA] < .06, Hu & Bentler, 1999; significant parameter loadings). The initial measurement model that was developed is shown in Figure 1 and Table 11 (Table 11 also includes the results for all of the structural models). In this model, the five Big Five personality traits are combined into one latent structure for personality, to determine whether the Big Five model (as a whole) can be used to predict motivation. Additionally, integrated regulation and identified regulation are combined into the latent variable of Autonomous Extrinsic Motivation (AEM), and introjected regulation and external regulation are combined into the latent variable of Controlled Extrinsic Motivation (CEM; Lonsdale et al., 2008b). Integrated regulation and identified regulation are grouped together in AEM because these types of motivation are very similar and are higher in their levels of self-determination (or more autonomous) than other types of extrinsic motivation. Conversely, introjected regulation and external regulation are also very similar, but are lower in self-determination, and are therefore classified as CEM (Lonsdale et al., 2008b). The Big Five personality variable was then used to predict the two motivational variables. However, the fit of this initial model was not adequate, $\chi^2 (N = 183, 24) = 72.52, p < .001; \text{RMSEA} = .11, \text{CFI} = .85, \text{TLI} = .78$. In this model, neuroticism did not fit well as a part of the latent Big Five personality variable.

To improve upon the fit of the model, the initial model was trimmed to address the poor fit of neuroticism. The trimmed measurement model (see Figure 2 and Table 11) is similar to the initial model, however in Figure 2, neuroticism was removed from the latent Big Five personality variable. The motivation variables are consistent with the motivation variables from the first model. This model shows improved fit over the initial model, although the fit is only moderately good in this case, $\chi^2 (N = 183, 17) = 39.04, p = .002; \text{RMSEA} = .08, \text{CFI} = .92, \text{TLI} = .87$.

After establishing an adequate measurement model, the next model attempts to use the personality variables to predict motivation. Figure 3 and Table 11 show the first
In this model, agreeableness, conscientiousness, extraversion, and openness were again combined into the latent Big “Five” personality variable, and neuroticism correlated with the overall personality latent construct. Integrated and identified regulation were again combined into AEM, and introjected and external regulation were combined into CEM. Intrinsic motivation and amotivation were also included in the model as motivation variables, so as to include the full range of motivation variables. The latent personality variable and neuroticism were used to predict the four motivation variables. The model had somewhat adequate fit, $\chi^2 (N = 183, 33) = 88.77, p < .001$; RMSEA = .10, CFI = .91, TLI = .85. The latent personality variable significantly predicted CEM and intrinsic motivation, while neuroticism significantly predicted CEM, intrinsic motivation, and amotivation (see Figure 3 for parameter estimates).

In the third model, the structure of the personality variables (the latent personality variable and neuroticism) were not an ideal fit for the model. Therefore, the next model (see Figure 4 and Table 11) deconstructed the latent personality variable and allowed all five personality variables to individually predict the motivation variables. The structure of the motivation variables was left unchanged from the previous model. The resulting model contained significant predictive relationships between extraversion, agreeableness, neuroticism, and the four motivation variables. Specifically, extraversion positively predicted AEM and agreeableness negatively predicted CEM (see Figure 4). Neuroticism negatively predicted intrinsic motivation and positively predicted CEM and amotivation. The fit for this model was good, although not ideal, $\chi^2 (N = 183, 15) = 38.35, p = 0.001$; RMSEA = 0.09, CFI = 0.96, TLI = 0.87.

The final hypothesis model improved upon the previous model and the fit indicated that the hypothesized model fit the data well, $\chi^2 (N = 183, 11) = 16.91, p = 0.111$; RMSEA = 0.05, CFI = 0.99, TLI = 0.97. This model, as shown in Figure 5 and Table 11, trimmed non-significant predictors (openness and conscientiousness) from the model, as these two variables did not fit well with the remaining three personality variables. The structure of the motivation variables was once again left unmodified, leaving agreeableness, extraversion, and neuroticism to independently predict each other and to predict the same four motivation variables. The resulting model revealed a number of significant predictive relationships. Agreeableness negatively predicted CEM and positively predicted intrinsic motivation (see Figure 5). Extraversion positively predicted AEM. Neuroticism positively predicted CEM and amotivation, and negatively predicted intrinsic motivation. An in-depth explanation of the underlying logic of the results of this final model will be explored further in the discussion section.

Discussion

Although there has been a great deal of research on the topics of personality and motivation, a number of questions remain, particularly in regards to athletics. The primary focus of the current study was to address some of these questions by examining the relationship between the Big Five model of personality and self-determined (or non-self-determined) motivation among college athletes. The statistical analyses revealed several significant relationships, which require further explanation.
The first analyses were correlations between all of the different personality and motivation variables. As expected, there were a number of significant correlations (see Table 2). However, with such a high proportion of the individual variables correlated with each other, no clear relationships between personality and motivation emerged from these analyses.

Therefore, regression analyses were conducted to further clarify these relationships. Several regressions were conducted, using the five personality variables to predict each of the nine motivation variables. Of the nine regression analyses, the regression with intrinsic motivation to know as the criterion variable was the only analysis that proved not to be significant. As previously mentioned, several patterns emerged from the regression analyses. First, neuroticism was the most common significant predictor of the five personality variables, suggesting that neuroticism may have a different relationship with the motivation variables, compared to the other four personality variables. Neuroticism was a significant negative predictor of intrinsic motivation, and a significant positive predictor of introjected regulation, external regulation, and amotivation. These results suggest that higher neuroticism is associated with lower levels of self-determined motivation, as predicted, which is consistent with other studies of personality and motivation in the academic (Clark & Schroth, 2010; Komarraju et al., 2009; Muller et al., 2006) and exercise (Ingledew et al., 2004; Ingledew & Markland, 2008) contexts. However, past literature did not address this relationship in the context of sport. The present findings extend previous research by demonstrating that higher neuroticism may be associated with lower self-determined motivation for athletes participating in their sports.

The regression analyses also revealed a pattern of results with regard to extraversion. Extraversion positively predicted both intrinsic motivation to achieve and integrated regulation, which are both higher in self-determination than the other types of motivation. These results were expected based on previous research. Clark and Schroth (2010) and Ingledew and colleagues (2004) also found that extraversion was associated with higher levels of self-determination, either intrinsic motivation or measures of autonomous extrinsic motivation. The current study expands upon previous research by revealing that the relationship between personality and motivation applies to the athletic context, as well as exercise and education (Clark & Schroth, 2010; Ingledew et al., 2004). In addition, the use of regression analyses extends previous correlational research by allowing extraversion to predict motivation while simultaneously accounting for the remaining four personality variables.

Additionally, agreeableness appeared as a significant predictor of motivation in multiple regressions. Agreeableness, as expected, negatively predicted introjected regulation and external regulation, which are both on the low end of the self-determination continuum. These results are consistent with past results that indicated agreeableness was negatively associated with low self-determined motivation (Clark & Schroth, 2010; Ingledew & Markland, 2008; Komarraju et al., 2009), and positively associated with higher self-determined motivation (Clark & Schroth, 2010). Again, past research examined personality and self-determined motivation in the education and exercise contexts only. The current study expands upon previous work by demonstrating similar relationships in the athletic context. In separate regressions, lower agreeableness was shown to predict lower levels of self-determination, meaning that athletes who are
lower in agreeableness are more likely to have low self-determined motivation to participate in their sports.

However, despite these patterns of results and the consistencies with previous literature, there were also a number of inconsistencies with the regression analyses. Conscientiousness predicted intrinsic motivation to achieve and openness predicted identified regulation, but these personality variables did not predict any other motivation variables. If conscientiousness and openness were strongly related to self-determination, then it would be expected that these variables would be associated with more than one of the motivation variables. For example, if conscientiousness was associated with intrinsic motivation to know and/or integrated regulation along with intrinsic motivation to achieve, then this would demonstrate stronger support for the relationship between conscientiousness and self-determined motivation. Given that these two personality variables were only significant in two regressions, the relationships between both conscientiousness and self-determined motivation, and openness and self-determined motivation, are weaker than expected in the sport context. This is inconsistent with previous research that has found these two traits to be significantly associated with self-determined motivation in other contexts (Clark & Schroth, 2010; 2012; Inglewed & Markland, 2008; Laurin & Nicolas, 2009; Muller et al., 2006). These results did not support the hypothesis that conscientiousness would be the strongest predictor of self-determined motivation.

There are a number of possible explanations for the inconsistencies between the results of previous studies, and the results of the current study. Across these different studies, slightly different measures of personality and motivation were utilized, and different statistical analyses were conducted. Perhaps most importantly, different samples were used. Most of the previous research involved students (college students and younger students) or exercisers, while the current study is the first to examine the Big Five model and self-determined motivation among athletes. It is possible that individuals’ reasons for participating in sports may vary from their reasons for participating in exercise or academic work.

Given the inconsistencies in the current and past studies that utilized correlational or regression analyses, SEM was employed to provide greater clarity to the current data. The final, best-fitting model revealed that agreeableness, extraversion, and neuroticism were all significant predictors of motivation (see Figure 5). Agreeableness positively predicted intrinsic motivation and negatively predicted CEM, which is in agreement with the regression analyses, which suggested that agreeableness is associated with greater self-determination. The model also showed that extraversion positively predicted AEM, which is consistent with the regression analyses regarding extraversion. Neuroticism positively predicted CEM and amotivation, and negatively predicted intrinsic motivation. Again, these results support the regression analyses, which demonstrated neuroticism as the strongest predictor of self-determined motivation. Neuroticism predicted three of the four motivation variables in the expected directions, suggesting that high neuroticism is strongly associated with low self-determination in athletics.

The hypotheses for the current study did not predict that agreeableness, extraversion, and neuroticism would be the personality traits that were the strongest predictors of motivation. However, previous research has found that these three traits are the most significant predictors from the Big Five model. For example, among a sample
of Croatian athletes, agreeableness, extraversion, and neuroticism were significantly related to aggression (Trninčić, Barančić, & Nazor, 2008). Similarly, these three personality traits have been shown to be the most important variables in predicting life satisfaction (Zhang, 2005), affect, interpersonal behavior (Côté & Moskowitz, 1998), and personality disorders (Saulsman & Page, 2004). And specifically in relation to motivation, conscientiousness is unusual in that it positively predicted both intrinsic and extrinsic motivation (Clark & Schroth, 2010; Hart, Stasson, Mahoney, & Story, 2007). Therefore, despite the fact that the hypotheses did not predict the relationships revealed in the current data, there is sufficient evidence to suggest that agreeableness, extraversion, and neuroticism may combine to be stronger predictors of motivation, compared to conscientiousness and openness.

The possible explanations for the relationships between agreeableness, extraversion, and neuroticism and different types of motivation may vary depending on the trait. For example, those high in neuroticism tend to have only a superficial interest in their activities, so their interest and motivation are not internalized and therefore not intrinsic or self-determined (Muller et al., 2006). Neuroticism is also associated with being impulsive and having low tolerance for frustration, and the lack of emotional stability makes it difficult to devote energy to their goals (Goldberg, 1990; Muller et al., 2006; Piedmont, 1998). This serves to minimize the amount of self-determination in their behaviors. While these studies did not specifically examine athletes, the same reasoning could be applied to the current data. Athletes high in neuroticism may have low self-determined motivation to participate in their sports because of a superficial interest in their sports, or because of a low tolerance for frustration.

Those high in extraversion may display more self-determined motivation because extraverts are sociable and enjoy interacting with others, and participating in social activities satisfies their need for relatedness (Costa & McCrae, 1992b; Ingledew et al., 2004). The same idea may hold true for agreeableness, as it relates to interpersonal interactions, as individuals high in agreeableness are friendly and cooperative, which helps them relate to others. They are internally motivated to participate in social activities because they innately enjoy the friendly interactions that develop as part of their participation (Costa & McCrae, 1992b; Ingledew et al., 2004). Athletes who are higher in extraversion and/or agreeableness may have greater self-determination to play their sports because sports are social activities that allow the athletes to interact with others in a cooperative manner. Because extraverts (and those high in agreeableness) take greater pleasure in social interactions, there is a greater likelihood that they will connect with others when in social situations, and therefore satisfy their need for relatedness. When they are in social situations in sports, those social situations are more likely to result in people developing social bonds and gaining increased relatedness. Gaining increased relatedness may give extraverts motivation to continue participating in their sports. When they are engaging in a sport to satisfy their need for relatedness, then their motivation for participating in the sport is more self-determined. In contrast, introverts are less sociable, and as a result, when introverts (and those low in agreeableness) are in the same social sport situation, they are less likely to be outgoing and cooperative. This makes it less likely that they are connecting with others as much as their extraverted counterparts, and are therefore not satisfying their need for relatedness. This may explain why those low in extraversion and agreeableness have lower self-determined motivation. There is less
reason for them to have self-determined motivation to participate in their sports if they are not having their psychological need of relatedness met. Although there is not a great deal of research on this specific topic in the sport context, it is consistent with reasoning in similar contexts (Costa & McCrae, 1992b; Ingledew et al., 2004).

Implications

The findings of the current study have valuable implications for coaches and sport psychology practitioners. Attempts to use measures of personality to predict athletic performance have been largely unsuccessful (Van den Auweele et al., 2001). However, the present study demonstrates that personality may be used to predict other key factors related to performance, specifically motivation. If a coach or sport psychology consultant is aware of an athlete’s personality, then that knowledge will also be useful in determining the athlete’s level of self-determined motivation. For example, if a coach knows that an athlete is high in neuroticism, the coach knows that the athlete is less likely to have high self-determined motivation to play his/her sport. Coaches or other sport psychology practitioners can benefit from additional knowledge about their players, and specifically about their players’ motivations. Coaches could even use that knowledge to adjust their coaching style or strategies. For example, if a coach knows that an athlete is highly agreeable and extraverted, the athlete is more likely to respond well to intrinsic motivational strategies, such as providing feedback that tells the athlete that he/she is competent at a skill (Weiss & Amorose, 2008). However, using external rewards that the athlete interprets as controlling would not be as effective for such an athlete. But if a player is highly neurotic, encouraging participation by utilizing the same external motivational techniques may be more effective. The athlete’s motivation can then be used to predict a number of variables, including athletic performance.

Motivation is a key factor related to several aspects of performance. In general, higher self-determined motivation is related to improved performance and persistence (Deci & Ryan, 2008; Ryan & Deci, 2000b) and improved psychological well-being. Specific to athletics, autonomous motivation predicts improved performance during competition (Gillet, Vallerand, Amoura, & Baldes, 2010), and athletes who were initially higher in self-determination outperformed their lower self-determination counterparts later in the sport season (Gillet, Vallerand, & Rosnet, 2009). Also, athletes with higher controlled motivation are more likely to experience negative consequences, such as burnout (Lonsdale, Hodge, & Rose, 2008a). The ability to predict an athlete’s level of self-determined motivation is valuable in predicting important consequences for the athlete. The present study expands upon these results by identifying significant predictors of motivation. Specifically agreeableness, extraversion, and neuroticism can be used to predict self-determined motivation. If personality predicts motivation, and motivation predicts performance (among other variables), this indicates that personality may be indirectly associated with athletic performance.

There are a number of strategies a coach, parent, or sport psychology consultant may employ to increase athletes’ feelings of autonomy, competence, and relatedness, and thereby increase self-determined motivation and possibly performance. They may promote a task motivational climate, encouraging improvement in skills and effort, as opposed to promoting an ego climate and social comparisons (Reinboth, & Duda, 2006). They could also be careful to use feedback that informs athletes that they are competent
and skilled in their sports (Weiss & Amorose, 2008). Coaches, specifically, could design practices that are challenging, but still ensure that the athletes can be successful and meet challenges. This serves to increase athletes’ competence by allowing them to reach reasonable goals and skill levels (Weiss, 1993). Coaches can also include fun activities during practices, to prevent athletes from feeling as though they are only participating in controlling, work-like drills (Weiss, 1993). Individuals could also organize social gatherings outside of the athletic context, to encourage teammates to become closer socially. By using these types of strategies, athletes may experience increased self-determined motivation to participate in their sports.

Limitations
There are some notable limitations that may reduce the generalizability of the results. The primary concern is the sample used in the present study. There was a relatively small sample size, which could limit the power of the statistical analyses. The sample also lacked diversity. Athletes from several different sports participated and there was diversity with regard to gender. However, there was little diversity in terms of race, age, level of competition (all participants were Division I athletes), and all participants were attending the same medium-sized Midwestern university. This significantly constrains the generalizability of the results. Additionally, all participant data was collected at only one point in time. Therefore, longitudinal follow-up data would be useful in demonstrating that personality can be used to predict motivation across time.

Future Research
As noted above, the results of the current study may not generalize to different groups of athletes, and thus the current study could be replicated with athletes from youth sports, recreational athletes, professional athletes, elite athletes, athletes with a wider range of racial diversity, and athletes from universities beyond the Midwest.

The current study established a noteworthy relationship between the Big Five model of personality and self-determined motivation. Future research could expand upon this relationship in different ways. The results from the current study demonstrate that personality is associated with motivation, and past research has linked motivation with consequences such as athletic performance. Future research could examine the relationships between all three of variables simultaneously and across time. This would allow researchers to more accurately predict performance based on personality, with motivation possibly as a mediating or moderating variable. For example, researchers could measure athletes’ personalities, motivations, and performance at the beginning of the season, and then measure the same variables at the end of the season. Researchers could then determine if athletes’ personalities are associated with motivation and indirectly with performance, and determine if these relationships are consistent across time. If the players with high self-determined motivation experience greater improvements in performance (than those lower in self-determination) from the beginning to the end of the season, then this would support the value of self-determined motivation in influencing improved athletic performance. Also, if personality consistently predicts self-determined motivation at both times, then this would support the indirect value of personality in predicting improved athletic performance. If a coach had this knowledge, then he/she would be able to use information about athletes’
personalities to know more about their motivation and performance across a season. The coach could then spend more time and energy to encourage self-determination for a team, using some of the strategies outlined above.

Another possible avenue for future research is to investigate the relationship between personality and self-determination using different personality constructs. The Big Five model includes only a small number of personality variables, while there are any number of personality traits that could be investigated in relation to motivation, such as aggression, optimism, altruism, impulsivity, Machiavelianism, masculinity/femininity, obedience/submissiveness, or sensitivity.
References


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*Note.* The potential range for the personality variables is 0-48. The potential range for the motivation variables is 1-7.
Table 2
Correlational Analyses

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*Note.* Neuro = neuroticism, Extra = extraversion, Open = openness, Agree = agreeableness, Consc = conscientiousness, IM = intrinsic motivation, IMK = intrinsic motivation to know, IMA = intrinsic motivation to achieve, IMS = intrinsic motivation to experience stimulation, IG = integrated regulation, ID = identified regulation, IJ = introjected regulation, EX = external regulation, AM = amotivation.

**p < .01 (two-tailed). *p < .05 (two-tailed).
Table 3
Regression analysis with the Big Five personality variables as predictors of intrinsic motivation

<table>
<thead>
<tr>
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Regression analysis with the Big Five personality variables as predictors of intrinsic motivation to achieve

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Regression analysis with the Big Five personality variables as predictors of intrinsic motivation to experience stimulation

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Regression analysis with the Big Five personality variables as predictors of external regulation

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Regression analysis with the Big Five personality variables as predictors of amotivation

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Table 11
\(\chi^2\), comparative fit index (CFI), Tucker Lewis Index (TLI), and Root Square Mean Error of Approximation (RSMEA) of the five structural equation models

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The latent Big Five personality variable predicts Autonomous Extrinsic Motivation and Controlling Extrinsic Motivation. Only significant paths displayed.
The latent Big Five personality variable (with neuroticism excluded) predicts Autonomous Extrinsic Motivation and Controlling Extrinsic Motivation. Only significant paths displayed.
Figure 3. First hypothesized model

The latent Big Five personality variable predicts intrinsic motivation and Controlling Extrinsic Motivation. Neuroticism predicts intrinsic motivation, Controlling Extrinsic Motivation and amotivation. Only significant paths displayed.

*** $p < .001$.
** $p < .01$.
* $p < .05$. 
Figure 4. Revised hypothesis model


*** $p < .001$.  
** $p < .01$.  
* $p < .05$.  

Appendix A

*The NEO-FFI-3 is a copyrighted inventory and should not be reproduced, disseminated, or used in any way beyond its specified use in the current study.

NEO-FFI-3
NEO Five-Factor Inventory-3

Form S- Adult
Self-report

Instructions:
Write only where indicated in this Item Booklet. Carefully read all of the instructions before beginning. This questionnaire contains 60 statements. Read each statement carefully. For each statement, fill in the circle with the response that best represents your opinion. Make sure that your answer is in the correct box.

Fill in SD if you *strongly disagree* or the statement is definitely false.

Fill in D if you *disagree* or the statement is mostly false.

Fill in N if you are *neutral* on the statement, if you cannot decide, or if the statement is about equally true and false.

Fill in A if you *agree* or the statement is mostly true.

Fill in SA if you *strongly agree* or the statement is definitely true.

Note that the responses are numbered in *rows*.

Fill in only one response for each statement. Respond to all of the statements, making sure that you fill in the correct response. **DO NOT ERASE!** If you need to change an answer, make an “X” through the incorrect response and then fill in the correct response.

*The NEO-FFI-3 contains copyrighted materials and is therefore not presented here.
Appendix B

Behavioral Regulation in Sport Questionnaire

Why Do You Participate in Your Sport?

Below are some reasons why people participate in sport. Using the scale provided, please indicate how true each of the following statements is for you. When deciding if this is one of the reasons why you participate, please think about all the reasons why you participate. There are no right or wrong answers, so do not spend too much time on any one question and please answer as honestly as you can. Some items may appear similar but please respond to all the statements by circling the appropriate number.

I participate in my sport…

1. because I enjoy it.
2. because of the pleasure I experience when I feel completely absorbed in my sport.
3. because it’s a part of who I am.
4. because it’s an opportunity to just be who I am.
5. because I would feel ashamed if I quit.
6. but the reasons why are not clear to me anymore.
7. because I would feel like a failure if I quit.
8. but I wonder what’s the point.
9. because what I do in sport is an expression of who I am.
10. because the benefits of sport are important to me.
11. because I enjoy the feeling of achievement when trying to reach long-term goals.
12. because I enjoy the feeling of success when I am working towards achieving something important.
13. because if I don’t other people will not be pleased with me.
14. because I like it.
15. I enjoy learning something new.

1 = Not true at all  4 = Somewhat true  7 = Very true
about my sport.
16. because I feel obligated to continue.  
17. but I question why I continue.  
18. because I feel pressure from other people to play.  
19. because of the excitement I feel when I am really involved in the activity.  
20. because people push me to play.  
21. because it’s fun.  
22. because it teaches me self-discipline.  
23. because I enjoy doing something to the best of my ability.  
24. because I would feel guilty if I quit.  
25. because I find it pleasurable.  
26. because I like learning how to apply new techniques.  
27. because I value the benefits of my sport.  
28. because I enjoy learning new techniques.  
29. because I love the extreme highs that I feel during sport.  
30. but I question why I am putting myself through this.  
31. because it is a good way to learn things which could be useful to me in my life.  
32. because of the positive feelings that I experience while playing my sport.  
33. in order to satisfy people who want me to play.  
34. because I get a sense of accomplishment when I strive to achieve my goals.  
35. because it allows me to live in a way that is true to my values.  
36. for the pleasure it gives me to know more about my sport.

Thanks for your help!
Appendix C

BACKGROUND INFORMATION SHEET

Gender (circle one):  F  M

Age: ______

Race (circle one):
American Indian/Alaskan Native  Asian/Pacific Islander
Black  Hispanic
White  Other

Scholarship Status (circle one):
Full Scholarship  Partial Scholarship  No Scholarship

Academic Year (circle one):
1st Year  2nd Year  3rd Year  4th Year  5th Year+

Number of years participating at a competitive level: ______

Level(s) of competition:
______________________________________________________________
______________________________________________________________
______________________________________________________________

Sport: _____________________